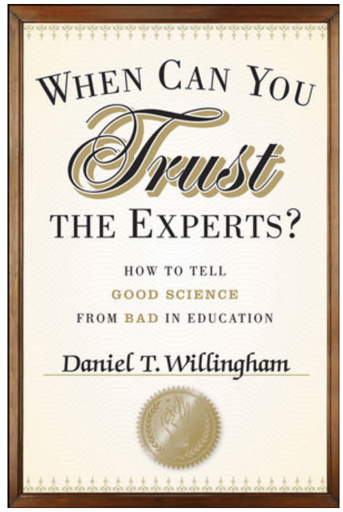
BOOK REVIEW: When Can You Trust The Experts?

By Dave Lehman, Connections Editor, NSRF National Facilitator, and CFG Coach in Wisconsin, davelehman@mac.com



When Can You Trust the Experts? How To Tell Good Science from Bad in Education

By Daniel T. Willingham, 2012, San Francisco: Jossey-Bass

Daniel Willingham, PhD professor of psychology at the University of Virginia, has once again produced a useful book for all educators. ***When Can You Trust the Experts?*** is a practical guide, as the subtitle indicates, to telling good science from bad in education. The book is conveniently organized into two parts: Part One, "Why We So Easily Believe Bad Science," and Part Two, "The Shortcut Solution," Willingham's four step process for answering the question in the book's title. He states the purpose of the book as "tell[ing] you how to evaluate new ideas – in particular, those related to education," so that you are less likely to be persuaded by bad evidence."

Willingham sucks us in with the "Golden Ratio" in his introductory chapter, reviewing this key number, 1.618, first described by the twelfth-century mathematician, Leonardo Fibonacci. Perhaps you've heard of the "Fibonacci sequence" in mathematics. The Golden Ratio is observed in the dimensions of various forms of architecture (the ratio of the height to the width of the Parthenon), throughout the animal world (Fibonacci arcs in seashells), plant world (leaves of many plants growing in a Fibonacci spiral), and in proportions of various parts of the human body (e.g. the ratio of the length of the wrist to the tip of the index finger to the length of the wrist to the elbow). Well known and frequently shared with students in math classes, the Golden Ratio is a fascinating number that seems universal. There's just one small problem, Willingham notes, "The Golden Ratio is bunk." He then proceeds to innumerate examples where the number does not hold true, concluding:

"The Golden Ratio is not interesting because it's true. It's interesting because the idea survives and continues to attract believers even though it is known to be wrong. In that way, it's an object lesson for the book. Knowing what to believe is a problem."

In education, Willingham points out that often all it takes to sell a new teaching approach, a new professional development program, a new reading series, or a new classroom product is to say it is "research based." This seems particularly true regarding claims from ed-marketers using neuroscience where all that is needed to sell an education product is to indicate it is "brain-based," or "based on brain research." Thus, the question for the practitioner is, "How can I know if the 'research' has been conducted in a valid and accurate manner, without having to become an expert researcher and statistician?" Here Willingham suggests a "research shortcut" involving the following steps:

"First, we need to understand what sorts of things people find persuasive….

Second, we need to understand how laypeople – not scientists – think about scientific evidence….

Third, if we're to have a research shortcut, we need to understand the path that we're cutting short."

In chapter one, "Why Smart People Believe Dumb Things," Willingham gives the reader various examples of how easily people can be persuaded to purchase or believe something. For example:

- "unconscious persuasion" as used in subliminal advertising,
- familiar ideas being more believable,
- what we might call "social proof," believing things that others believe, particularly people who are like us,
- or the use of attractive people to sell us something.

Going further, Willingham gives various examples from real life situations, not just education, where "confirmation bias" steps in. In that case, we believe something new simply because it confirms something we already believe. We say to ourselves, "Yes, yes, I already know this. I'm so glad you agree with me." And our beliefs help us "maintain our self-identity," protect our values," "maintain social ties," and "manage our emotions."

In subsequent chapters, Willingham traces the dramatic changes in reasoning that accompanied the European transformation of the "enlightenment" and "romanticism" with the rise of scientific evidence and personal experience as the key elements involved in supporting peoples beliefs. He provides useful summary charts at the end of each chapter. In discussing what is "good science," Willingham's summary chart includes these seven principles of good science:

- Science is dynamic and self-correcting,
- Scientific theories apply only to the natural world,
- Scientific method works only if the phenomenon under study can be measured,
- Theories cannot be proven true, only falsified,
- Good theories are cumulative,
- Scientific tests are empirical, and
- Scientific tests are public.

It also provides insightful implications for education for each of these summary points. For example, in looking at the education implications for "good theories are cumulative," he notes "education has a history of reintroducing theories under a different name, even though the theory has been tested and found wanting." And in ending Part One of *When Can You Trust the Experts?*, Willingham reviews four challenges to applying data from natural science to education:

1. Goals are often unstated or implied. Because education is a goal-driven enterprise, this vagueness makes it hard to know which findings from basic science are relevant, and to draw implications from those that are relevant.

Dave Lehman is the former founding principal/teacher of the Lehman Alternative Community School, a public middle- high school recently named after him and his wife by the Ithaca, New York Board of Education upon their retirement after 30 years. He currently is doing "School Improvement Coaching" with the middle schools and high schools in Madison, Wisconsin.

Contact him with your questions or comments at davelehman@mac.com

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2. Feedback is essential to knowing whether we're moving toward or away from our education goal, and feedback is lacking for many of the outcomes we might care about (for example, creativity or analytic problem solving).

3. We know much more about children (the inner environment) than we do about classrooms (the outer environment), and we need knowledge of both if we are to apply basic scientific knowledge to education with confidence.

4. Even if you can manipulate a cognitive process and be confident of the cognitive consequence, you can't guarantee the same outcome in education because (a) you may unintentionally change other cognitive processes too, and (b) the changed process may interact with other cognitive processes in ways you didn't predict."

From this rather discouraging, pessimistic end to Part One, Daniel Willingham proceeds in Part Two to offer a four-step process to help evaluate the likely scientific soundness of a proposed curriculum, teaching strategy, textbook, or anything else that is purported to help children learn.

He notes that in order to do this kind of evaluation in education you will need to be clear about three things: 1) precisely what is being proposed in a given, recommended change, 2) precisely what outcome is promised as a result of the proposed change, and 3) the probability that the outcome promised will actually happen as a result of the change.

The first step in Willingham's evaluative process he calls "Strip It and Flip It." You need to strip the claim to its bare essentials, eliminating pat phrases and images meant to call to mind themes from Enlightenment thought (technical jargon, terms such as "research-based" or "brain-based") as well as phrases still evident from the Romantic period (such as "unleash" or "natural" or "tailored to your child"). Also strip out proposed change of emotion, as emotional appeals don't provide evidence that a particularly proposed change will actually work. And strip out statements that claim to be "just like you," or that draw potentially convincing analogies. Such claims or analogies don't really increase the probability that the solution will work.

Then, to "Flip It," means to summarize in the following ways:

1. Consider whether the promised outcome can be described another way. If it's described positively, is there a negative side to it? (For example, a "pass rate" can also be described as a "failure rate.")

2. Consider not just the consequences of undertaking the Change, but the consequences of doing nothing.

3. Combine the two flips. When comparing the consequence of undertaking the Change (versus doing nothing), also be sure to make that comparison with the outcome flipped.

The second step is "Trace It." This involves tracing the source of the proposed change and being extra cautious of claims from authorities. Here Willingham suggests we can trust authorities when: *(1) a reliable licensing professional organization certifies their expertise (such* *as having research published in a peer-reviewed journal), (2) there is a known truth in the field on which acknowledged experts agree (and the original study has been successfully replicated, preferably more than once by different researchers), and (3) this agreed upon truth allows experts to analyze problems accurately and prescribe solutions that work in most situations and don't require skill from a non-expert.*

The third step is "Analyze It." In this chapter, Willingham helps the reader to know how to think about evidence in considering adopting a proposed change. Use one's own experience to assist in evaluating claims, and detect what may look like evidence but really isn't. He also encourages using the technical scientific literature. For example, he points out the importance of being able to recognize the "bait-and-switch" technique common in some marketing materials. Some unscrupulous marketers cite perfectly sound research, which happens to relate only slightly, if at all, to the proposed change. Personal testimonials can be another caution worth analyzing, and here, too, Willingham ends this chapter with a useful summary chart.

The fourth and final Step of Willingham's evaluative process involves answering the key question, "Should I Do It?" Here, he begins the chapter with a summary chart of the "principles of good science" as a review to use in considering whether or not to adopt a proposed change. This chart is organized around four groups of key questions. The first set yields answers that are what Willingham calls "deal breakers" which should indicate an end to considering the proposed change. The second set yields disappointing answers that should at least raise your suspicions about the efficacy of the change. The third set would indicate there isn't scientific evidence in support of the change— it may be difficult to measure and so it still might be worthwhile. Answers to the fourth set of questions may simply indicate that the change is not a good fit for you in your educational situation.

Here Willingham suggest a checklist, not unlike that used by airplane pilots, to determine if you should adopt a proposed change. And he ends with three changes he believes would significantly improve education: 1) individuals who are better able to discern good science from bad, 2) institutions that are willing to help in that job, and 3) a change of mindset for all in how science relates to educational practice.

This is a useful guide to any educator at any level from elementary to college, and if they only used the summary charts, it would be worth the price of the book.

I would be interested in what those who use Willingham's suggestions think of his process. Let us know at NSRF if you try the practices he suggests and your results.

Willingham's four-step process to help evaluate the likely scientific soundness of a proposed curriculum, teaching strategy, textbook, or anything else purported to help children learn:

1. Strip it and

Flip it.

2. Trace It.

3. Analyze It.

4. Should I Do It?